(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 July 2005 (21.07.2005)

PCT

(10) International Publication Number
WO 2005/065396 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/US2004/043999

(22) International Filing Date:
31 December 2004 (31.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/533,537 31 December 2003 (31.12.2003) US

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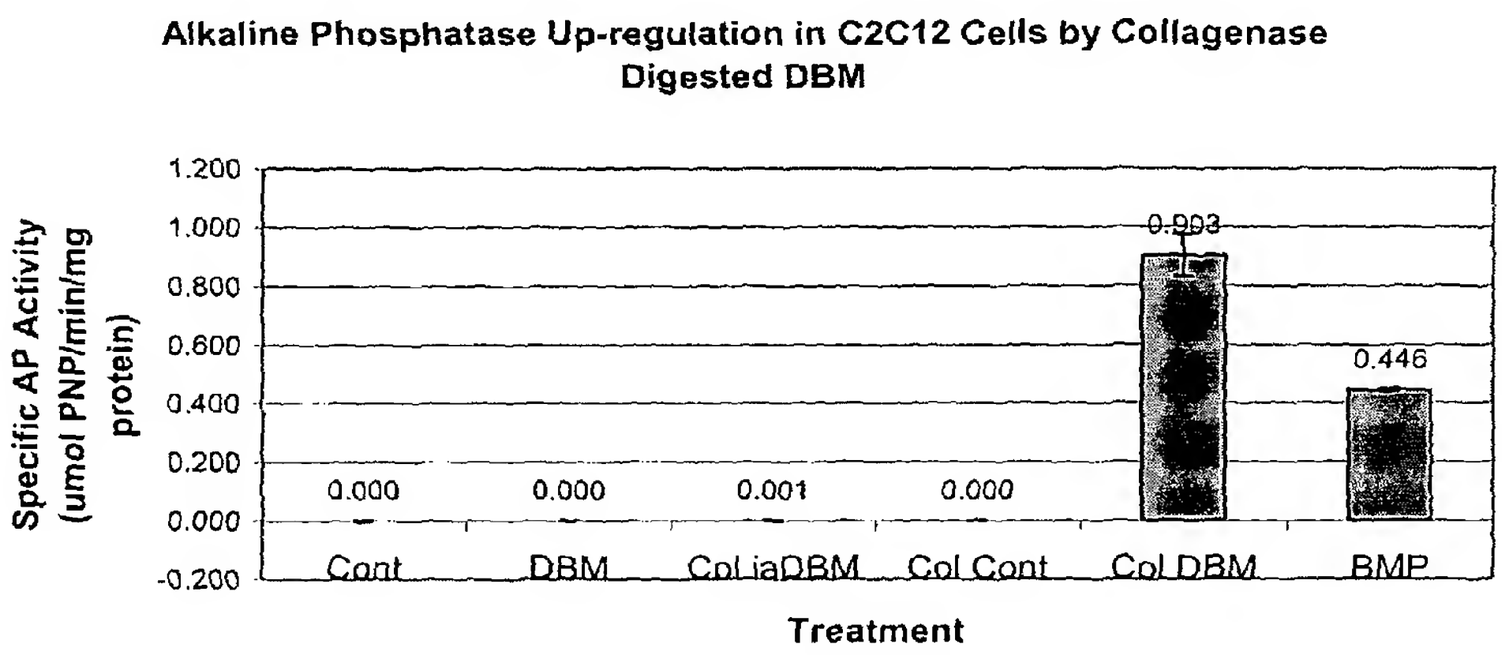
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

[Continued on next page]

(54) Title: IMPROVED BONE MATRIX COMPOSITIONS AND METHODS



(57) Abstract: The present invention provides methods of improving the osteogenic and/or chondrogenic activity of a bone matrix, e.g., a dermineralized bone matrix (DBM), by exposing the bone matrix to one or more treatments or conditions. In preferred embodiments the bone matrix is derived from human bone. The treatment or condition may alter the structure of the bone matrix and/or cleave one or more specific proteins. Cleavage may generate peptides or protein fragments that have osteoinductive, osteogenic, or chondrogenic activity. Preferred treatments include collagenase and various other proteases. The invention further provides improved bone and cartilage matrix compositions that have been prepared according to the inventive methods and methods of treatment using the compositions. The invention further provides methods of preparing, testing, and using the improved bone matrix compositions. Ona assay comprises exposing relatively undifferentiated mesenchymal cells to a bone matrix composition and measuring expression of a marker characteristic of osteoblast or chondrocyte lineage(s). Increased expression of the marker relative to the level of the marker in cells that have been exposed to a control matrix (e.g., an inactivated or untreated matrix) indicates that the treatment or condition increased the osteogenic and/or chondrogenic activity of the bone matrix. Suitable cells include C2C12 cells. A suitable marker is alkaline phosphatase. The inventive methods increase the osteogenic and/or chondrogenic activity of human DBM when tested using this assay system.

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